AIR QUALITY

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INTRODUCTION

Metcalf Energy Center, LLC (MEC-LLC) submitted a petition to amend the Conditions of Certification for the Metcalf Energy Center (MEC). These amendments include the allowance for periodic combustor replacement and subsequent tuning, an increase in the allowable startup time (from two hours to six hours), a decrease in the length of commissioning operational hours (from 300 hours to 50 hours) and several changes to emission limits during startup and commissioning. Staff is currently reviewing the petition and air dispersion modeling provided. Staff submits these initial data requests to clarify the following issues.

ISSUES AND DATA REQUESTS

INCREASED CO EMISSIONS DURING COMMISSIONING

Background

MEC-LLC has requested that the carbon monoxide (CO) emission limits during commissioning be increased from 930 lbs/hour to 5,000 lbs/hour. In the discussion for the necessity of this requested increase, MEC-LLC sites the "experience of other large gas turbine facilities in commissioning their turbines." Staff is unfamiliar with any commissioning experience that would lead staff to the same conclusions as MEC-LLC. Therefore, staff asks that MEC-LLC clarify their statement by adequately responding to Data Request-1.

Data Request

1. Please submit all relevant monitoring data including, but not limited to, fuel use, CEMS (particularly CO) data and emission factors (and their derivation), that MEC-LLC referred to in their petition to amend as "the experience of other large gas turbine facilities in commissioning their combustion equipment."

DECREASED OPERATION TIME DURING COMMISSIONING

Background

MEC-LLC has petitioned the Commission to lower the number of hours during which the MEC turbines may operate without abatement (SCR and oxidation catalyst emission controls) from 300 to 50 hours. MEC-LLC states that this is also a reflection of experience from commissioning other large turbine facilities. While staff does not doubt that MEC-LLC can complete the installation of the SCR and oxidation catalyst within 50 operational hours of the start of commissioning, tuning and balancing the emission controls may take far more time. It is staff's experience that project owners need (and petition for) more time during commissioning for large turbine facilities, not less.

Therefore, staff asks that MEC-LLC clarify their request by adequately responding to Data Requests-2 through 5.

Data Request

2. Please provide a detailed revised initial commissioning schedule that specifically identifies each component test protocol and how those test protocols differ from the originally proposed initial commissioning test schedule.

3. Please submit all relevant information that leads MEC-LLC to conclude that all combustion equipment and steam side components can be properly tested and adjusted within the first 50 operational hours before installation of the SCR and oxidation catalyst emission control systems.

4. Please submit a letter from manufacturer(s) of all components (such as the gas and steam turbines, HRSGs, etc.) that they understand the proposed initial commissioning schedule and they agree that such a schedule will not cause damage to their components nor void their component warrantees.

5. Please provide, based on the information provided in Data Requests-2 and -3, a NOx emission estimate for each major milestone during the commissioning procedure, beginning with first-fire and ending with final CEMS confirmation.

AMMONIA SLIP FORMULA

Background

MEC-LLC is proposing to modify Condition of Certification AQ-20 (e) to a more simplified requirement that depends on "a District approved ammonia slip calculation." However, that calculation is not discussed or presented in any form. Staff has, on other recent amendments, found that the District calculation methodology was severely lacking in enforceability to such an extent that staff was required to develop a separate more enforceable methodology. Therefore, staff requests that MEC-LLC adequately respond to Data Request-6.

Data Request

6 Please provide the District policy for enforcement of the ammonia slip limit, the ammonia slip calculation formula and methodology approved by the District including, but not limited to, the timing and location of all necessary flue gas sampling and ammonia injection rate sampling, and required source testing.

DAILY LIMIT INTEGRITY

Background

MEC-LLC is proposing new emission limits for "combustor tuning" wherein worn combustors are periodically replaced and the turbine is subsequently re-turned. Emission limits are proposed for combustor tuning events for the emissions of NOx, CO and Precursor Organic Compounds (POC). Given the standard procedures for combustor tuning that staff is aware of, the MEC might exceed its daily emission limits for NOx, CO and POC while complying with its combustor tuning limits, startup limits and operational limits under the current MEC-LLC proposal. While NOx and CO are monitored in stack, thus giving the operator ample warning to avoid violating those daily limits, POC is not. POC is verified once a year through source testing, for normal operation. POC emissions during startup and combustor tuning events are not typically source tested. Therefore, it is possible for MEC to exceed the POC daily limit unbeknownst to the operator, or anyone else. There are solutions for this situation, but further information will be necessary. Therefore, staff requests MEC-LLC to adequately respond to Data Request-7 through -9.

Data Request

7 Please explicitly identify all combustor tuning procedures and corresponding emission amounts during a 6-hour combustor tuning event that may emit NOx, CO and POC.

8 Please discuss the proposed daily operation and corresponding emissions of the MEC facility for the presumed worst case scenario to justify the daily emission limits. The most reasonable worst case daily operation should include, but is not limited to a combustor tuning event and maximum operation at 100% load with the duct burners on.

9 Please discuss the procedure or source testing protocol by which the POC emissions during a startup event and a combustor-tuning event can be verified.

ANNUAL LIMIT AND OFFSET INTEGRITY

Background

Making some simple assumption regarding the facility operation, staff found that the annual NOx emission limit might be violated while complying with the combustor tuning, startup, shutdown and normal operation emission limits. Staff finds that it would be unlikely that the MEC would exceed the annual NOx emission limit given that NOx emissions are monitored by the CEMs. However, since the short-term emission limits are being revised, staff needs to be sure that the current annual limits are still appropriate and can still be met. Therefore, staff requests the MEC-LLC adequately respond to Data Request-10.

Data Request

10 Please provide all operational assumptions and corresponding emission calculations to show that the MEC facility emissions of NOx, CO, POC, SOx and PM10 will remain under the current annual emission limits.

PSD SIGNIFICANCE THRESHOLD

Background

On page 10 of Appendix A, the application to the Bay Area Air Quality Management District, MEC-LLC compares the maximum-modeled impact of the proposed changes to the PSD Significance threshold. The results show that the proposed modifications clearly exceed the NO2 1-hour threshold and CO 1-hour and 8-hour threshold of BAAQMD Rule 2-2-233. However, MEC-LLC does not discuss the ramifications of exceeding those significance thresholds nor how they will comply with PSD requirements of the BAAQMD Rules and Regulations. Therefore, staff asks MEC-LLC to clarify their position on this matter by adequately responding to Data Request-11.

Data Request

11 Please discuss how exceeding the significance thresholds of Table 11 of the amendment request does not require additional PSD analysis including ambient air quality monitoring as required in Rule 2-2-414.3.

COLD STARTUP DEFINITION

Background

MEC-LLC is proposing to add a definition for "Gas Turbine Cold Startup Period:" in the Conditions of Certification, Definitions section. The definition restricts cold startup to 360 minutes beginning with the initiation of fuel flow to the gas turbine as the beginning and ending when the gas turbine achieves two consecutive CEM data points in compliance with the emission concentration limits. Staff finds there is a difficulty with this definition concerning the term "CEM data points." The CEM will "poll" the various sensors within its system approximately every 15 seconds. These 15-second data points are typically averaged or summed (depending on the control system) into 15-minute and eventually 1-hour data points. The referenced emission limit within the definition proposed by MEC-LLC is the NOx 1-hour average limit of 2.5 ppm at 15 percent O2. Thus, it is difficult for staff to determine what "CEM data points" means. Therefore, staff requests the MEC-LLC adequately respond to Data Request-13.

Data Request

12 Please refine the definition of "Gas Turbine Cold Startup Period" such that it can be easily determined and verified.

COMBUSTOR TUNING RECOMMENDATION

Background

In the definition for "Combustor Tuning Activities:" MEC-LLC defines these activities as those that are recommended by the turbine manufacturer to ensure the safe and reliable operation of the gas turbine following a combustor replacement. Since combustor-tuning activities have not been well defined in the amendment request, staff requests further information regarding the manufacturer's stated recommendations. Therefore, staff requests that MEC-LLC adequately respond to Data Request-13.

Data Request

13 Please submit all turbine manufacturer recommendations, procedures and protocols regarding the initial and subsequent tuning requirements for the MEC gas turbines.

COMBUSTOR TUNING PERIOD DEFINITION

Background

The definition that MEC-LLC proposed for the combustor-tuning period is insufficient to define the period. There is no beginning defined and no end defined. It is staff's opinion that, under this definition, adequate tuning could not take place, nor can an enforceable permit condition be crafted that can apply to combustor-tuning episodes. Therefore, staff requests that MEC-LLC adequately respond to Data Requests-14 and –15.

Data Requests

14 Please provide a definition of the beginning of combustor tuning that is coincidental with the initiation of fuel into the newly replaced combustor or other suitable event.

15 Please provide a definition of the end of combustor tuning that is coincidental with the recommendations of the gas turbine manufacturers.

DELETION OF STARTUP HOURLY EMISSION LIMIT

Background

MEC-LLC is proposing to delete the hourly startup emission limits, stating that they are overly restrictive in some cases. It is the intention of emission limits to be restrictive, even overly restrictive, in support of the Commission Decision. Therefore, the restrictive nature of an emission limit can not be used as the sole rational for its deletion. MEC-LLC has indicated that changes to other emission limits are a result of their experience with the Delta Energy Center and the Los Madenos Energy Center. Data from these power plant facilities showing a consistent violation of the emission limits proposed for MEC could be used to justify deleting the hourly startup emission limits. Therefore, staff requests that MEC-LLC adequately respond to Data Requests-16

Data Request

16 Please provide all CEMS data for NOx and CO emission, all relevant data recorded for POC emissions, and any other relevant emission recordings for all startups at the Delta Energy Center and Los Madenos Energy Center that supports the proposed deletion of the hourly startup emission limits for MEC.

AMBIENT AIR QUALITY MONITORING

Background

MEC-LLC is currently monitoring the ambient air quality near the MEC project site. However, MEC-LLC has been activity monitoring for only a short while, approximately early November. The background ambient air quality being used in the petition is from the San Jose area and may not represent the MEC project site. There is clearly too little monitoring data available from the MEC project site to be used to represent the area ambient air quality. However, it is important to scrutinize what local monitoring data is available to ensure that the representative ambient air quality data is reasonable. Therefore, staff requests that MEC-LLC adequately respond to Data Request-17.

Data Request

17 Please provide all available ambient air quality monitoring data from the MEC project vicinity in raw format for all available pollutants including, but not limited to CO, NO_2 and PM10.

ADDITIONAL AIR DISPERSION MODELING

Background

MEC-LLC has provided substantial air dispersion modeling for the requested emission limits in the petition. The modeling of CO emissions during commissioning assumed that both turbines would be emitting half of the proposed hourly emission limit of 5,000 lbs/hour. This proposed CO emission limit is intended to restrict the total emissions from both exhaust stacks. Thus a likely commissioning scenario is that both turbines are in commissioning at the same time and use up the maximum allotted limit. However, what is also allowable under the proposed CO emission limit is that one turbine can be in commissioning while the other is off-line and the maximum allotted limit is used. While this scenario is unlikely, since it is permissible under the proposed CO emission limits and may produce slightly different impacts on the ambient air quality. Therefore, staff requests that MEC-LLC adequately respond to Data Request-18.

Data Request

18 Please provide air dispersion modeling for CO emissions (both 1-hour and 8-hour) during commissioning, representing one turbine and HRSG in operation at the maximum proposed limit (5,000 lbs/hour for the 1-hour standard and 20,000

lbs for the 8-hour standard) while the other turbine and HRSG is not operating and thus not emitting.

INCREASED EMISSION LIMITS FOR SHUTDOWN

Background

MEC-LLC is proposing to increase the shutdown emission limits for NOx, CO and POC substantially, siting their experience at other similar power plants. However, these emission limits appear to be similar to only the Delta Energy Center and not the Los Medanos Energy Center shutdown emission limits. Therefore, staff requests that MEC-LLC clarify their proposal by adequately respond to Data Request-19.

Data Request

19

a. Please provide all CEMS data (for NOx and CO), all relevant POC emissions data recorded or other relevant data recordings during all shutdown events at both the Delta Energy Center and the Los Medanos Energy Center that support the shutdown emission limit increases proposed by MEC-LLC.

b. If the data requested in 19(a) is not available, please justify the proposed shutdown emission limit increases with whatever data and rationale is available.

COMBUSTOR TUNING EMISSION LIMITS

Background

MEC-LLC is proposing NOx, CO and POC emission limits for a combustor-tuning event (limited to 6 hours in duration) based on the current emission limits for a normal startup (limited to 3 hours in duration). Thus, the proposed emission limits for a combustor-tuning event are exactly double those of the normal startup event. However, as MEC-LLC has stated for other emission limit increases, they have extensive experience at similar power plant facilities. Specifically, MEC-LLC cites the Delta Energy Center and the Los Madenos Energy Center as their source of experience. Therefore, staff requests that MEC-LLC justify their proposal by adequately respond to Data Request-20.

Data Request

20 Please provide all CEMS data for NOx and CO, all relevant data recorded for POC emissions, and any other relevant emission recordings for all cold startups or combustor-tuning events at the Delta Energy Center and Los Madenos Energy Center that supports the proposed emission limits for MEC.